

## REMARKS

### **Amendments to the Specification**

The Examiner has noted that no copy of the Japanese Abstract developed by the PCT Search Authority was provided. Applicants apologize for the oversight and are submitting the Japanese Abstract herewith. It is not clear if the reference to Maeda, K. et al. was considered by the Examiner so it is being re-submitted herewith for convenience.

The Examiner has noted that Applicants' election was silent with respect to the Figures on which claims 48 to 53 depend. Applicants apologize for the oversight. Claim 48 and claims 49 and 50 depending from claim 48 reads on Figure 5. Claim 51 reads on Figure 11a and claim 52 reads on Figure 14. Claim 53 has been amended to depend from claim 1. Claims 1, 3, 6 and 8-10 have been acted upon and claims 2, 5, 7 and 11-53 have been withdrawn.

The Examiner has presumed on page 3 of the Action that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicants submit that the subject matter of all the claims is "commonly owned" by all inventors.

Applicants have carefully considered the rejections raised in the Action dated December 13, 2005. As a result, the specification including claims have been amended to comply with the Examiner's requirements as outlined herebelow. The claims have been amended to more particularly point out and claim the present invention.

Claims 1, 3, 6 and 53 have been amended to more clearly and concisely recite the present invention. Particularly, claim 3 has been rejected under 35 U.S.C. § 112, second paragraph for being indefinite. Responsively, claim 3 has been amended as suggested by the Examiner to insert the word --each-- before the phrase "said positioning mechanism". Since the term "motors" was introduced in claim 2 and claim 3 depends from claim 1, claim 3 has been further amended to delete the term "motors" and insert the appropriate limitation from claim 1, namely the phrase "positioning mechanisms".

With respect to the amendments to claim 1, in view of the previous amendment to add the phrase -- moving the second ends of said at least three cables-- (see the amendment to claim 1 made in the response to the Restriction Requirement), claim 1 has further been amended to delete the phrase "retracting or deploying each of said at least three cables. This corrects the grammatically awkward and hard to understand claim 1 after it was amended previously. Applicants note it was their original intention to amend the claim in this way.

The embodiment shown in Figure 3 uses "passive" cables connected to the end effector which is described on page 13 of the present application and claim 1 is amended to recite that:

"said at least three cables having second ends being attached to an associated positioning mechanism for moving the second ends of said at least three cables ..."

This amendment makes claim 1 consistent with the embodiments shown in Figure 3 (read upon by claim 1, 3, 6, 8, 9 and 10) in which the ends of the cables

are not wound or unwound as is the case with the embodiment of Figure 1 for example which is read upon by claim 2, now withdrawn.

Claim 1 has also been amended to recite --a length of each of said at least three cables between said end effector and said associated positioning mechanism being fixed,--

This amendment is fully supported in the Detailed Description of the Invention, on page 3, line 29, as well as in Figures 2 and 3.

In addition to the above-mentioned amendments, claim 6 has also been amended to correct a grammatical error by replacing "at least three cables is" with --at least three cables are--.

### **Patentability of the Claims Over the Cited References**

Claims 1, 3, 8 and 10 have been rejected under 35 U.S.C. § 102(b) as being anticipated by the reference United States Patent No. 4,666,362 issued to Landsberger et al. (Landsberger). Reconsideration of the grounds for rejection under 35 U.S.C. § 102(b) is respectfully solicited for the following reasons.

Claim 1 has been amended to specifically recite that "a length of each of said at least three cables between said end effector and said associated positioning mechanism being fixed,"

This limitation is not disclosed in Landsberger since in the disclosure of Landsberger only "active" cables are used. The present invention includes embodiments of robotic mechanisms which include both "active" and "passive" mechanisms. As defined on page 3, line 29 the embodiments having "passive" cables are characterized in that the "**Passive cables are cables whose lengths are fixed.**" Landsberger clearly teaches that the cables are "active" in the sense

that the length of the cables are varied since they are deployed and retracted using motors 26 and spools 24, see column 4, lines 1 to 4, column 5, lines 10 to 20 and claim 1 (column 7, last two lines), and claims 2 and 3.

In view of the amendment to claim 1 to specifically recite the limitation of "passive" cables such that the length of the cables between the end effector and the positioning mechanism remains fixed, it is respectfully submitted that, since this feature is not disclosed or suggested in Landsberger, the latter cited reference does not anticipate claim 1.

The structure of amended claim 1 is very advantageous since for the type of active cable system disclosed in Landsberger, using spools or winches to retract and deploy the three (or six) cable robots introduces complications both in the mechanism and modeling of a cable robot. As a spool rotates to deploy or retract the cables, its diameter changes and hence the contact point of the cable with spool varies with the position of the other end of the cable, thereby making it difficult to model the cable robot.

Claim 6 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Landsberger in view of the prior art Figure 1 of Salisbury, et al. (Salisbury). In view of the comments above regarding Landsberger, Applicants submit that the combination of Landsberger and Salisbury does not give the structure of claim 6 or leads one of ordinary skill in the art to this structure. Again Landsberger discloses three (3) (Figures 1-4) or six (6) (Figures 5-6) active cable robotic mechanisms in which the cables are spooled, thereby changing their lengths.

In the recited structure of claim 6 there are three (3) pairs of cables such "that two cables of each pair of cables are parallel to each other and define a parallelogram so that the robotic mechanism has three degrees of freedom so

that during movement of the end effector the orientation of the end effector remains fixed so that the robotic mechanism has three degrees of freedom."

The purpose of Salisbury's design is to transmit rotational motion of a drive shaft to a distant driven shaft which may not be parallel to the first one. As a result, both ends of the cables are attached to rotating shafts which is not the case in the structure of claim 6. In Salisbury's design, the reason for using two cables is to transmit motion in both direction (note that cables can pull but not push) while in the structure of present claim 6, the purpose of using two cables is to form a parallelogram which acts to kinematically constrain the motion of the end-effector and removes its rotational degrees of freedom.

In view of the foregoing, Applicants respectfully submit the structures of claims 1, 3 and 8-10 are neither disclosed in Landsberger nor is claim 6 obvious from Landsberger and Salisbury.

Also in the Office Action, the Examiner indicated that he did not consider the Japanese patent reference cited on the Information Disclosure Statement (IDS) filed March 1, 2004, because a copy of that reference was not included. In response, a supplemental IDS, including a copy of the Japanese patent reference and the required fee, will be filed.

Should the Examiner have any questions concerning this matter, the Examiner is invited to contact the undersigned attorney of record at the telephone number shown below for purposes of further expediting the prosecution of this application.

As this response is being filed after the shortened statutory period, a separate request for extension of time until June 13, 2006, is submitted herewith. Any deficiencies in the extension fees may be charged to Deposit Account 04-1577.



Respectfully Submitted;

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